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THE ALBERTA AGRICULTURAL RESEARCH TRUST

Annual Report

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PROVINCE OF
ALBERTA

1969 – 1970

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INTRODUCTION

The real story of Canada's ability to produce vast quantities of high quality food is not so much on the land, but in the research laboratories and experimental institutions where new plant varieties, improved livestock feeding methods and many other advancements are developed.

The Alberta Agricultural Research Trust is playing its part in these advancements.

Although it has been in existence for only a short period of time, already completed research projects have solved some problems and the discoveries are being utilized by the agricultural industry in Alberta.

This statement is entered as an early evaluation that the Trust is achieving the objective of improving agriculture in the province by funding research on practical problems of economic importance.

Details will be found in the text of this report.

On behalf of the Board of Trustees, I am extending our appreciation to the research scientists, the grants committee, and all the contributors of financial assistance for enabling the Trust to reach this state of maturity now that its value can be proven.

E. E. Ballantyne, D.V.M., P.Ag., F.R.S.H.
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PROJECTS COMPLETED PRIOR TO OCTOBER 1969

Date Following Title Identifies Annual Report in which Summary of Results Appears

AGRICULTURAL ENGINEERING

HARRISON, H. P.	*Analysis of local weather data for grain and hay drying systems*	(1968-1969)
HARRISON, H. P.	*Effect of selected mechanical parameters on threshing efficiency*	(1968-1969)
MacHARDY, F.V.	*The effect of temperature on the keeping quality of tough and damp cereal grains*	(1968-1969)
PRESTON, T.A.	*Compilation of time*	(1968-1969)

ANIMAL SCIENCE

GRIEVE, C. M.	*Effect of physiological growth stage at harvest on forage quality and nutrient productivity*	(1968-1969)
MILLIGAN, L. P.	*Factors controlling urea utilization in the ruminant*	(1968-1969)

FOOD SCIENCE

JACKSON, H.	*Studies on the significance of staphylococci in the manufacture of cheddar cheese*	(1968-1969)
WOOD, F. W.	*Carmelization defect of vacuum-packed sweet corn*	(1968-1969)

PLANT SCIENCE

CORNS, W. G. *Shore vegetation control*	(1968-1969)
VANDEN BORN, W. H. *Green foxtail: growth habits and control*	(1968-1969)
VANDEN BORN, W. H. *Herbicide testing in field and greenhouse experiments*	(1968-1969)

SOIL SCIENCE

ROBERTSON, J. A. *Quality of barley grown with various fertilizers*	(1968-1969)
ROBERTSON, J. A. *Nature of available phosphorus in Alberta soils*	(1968-1969)
TOOGOOD, J. A. *The nutritive value of crops grown on a Grey Wooded soil*	(1968-1969)

PROJECTS COMPLETED BETWEEN OCTOBER 1969 AND OCTOBER 1970

AGRICULTURAL ECONOMICS

BERG, E. R.*

Hedging procedures in cattle judging operations

Few fields of endeavor offer as good an opportunity to make large profits rapidly as does speculation in the commodity futures market. Speculative profits of several hundred or even thousands of percent are not uncommon. By the same token, for each person who profits, someone must lose. Thus over time speculators have gone to great lenghts to "beat the system". Basically two main types of analysis of the futures market have been developed: fundamental and technical analysis. However, a new method of predicting futures price changes through the use of volume and open interest data has given even greater insight. The resulting model, based on generally accepted economic theory has associated with it certain assumptions that are made with respect to the behaviour of futures market participants. Over 600 commodity spreads for the period 1958-1968 have been examined along with volume and open interest data. There appears to be little doubt that, for five of the six commodities tested, volume and open interest are related to commodity price spreads and explain part of the non-random commodity price changes occurring over time.

*The project was conducted by T. W. Manning, W. E. Phillips and A. A. Warrack after E. R. Berg died in March 1968.

HAWKINS, M. H.

Livestock marketing practices

The study concerned itself with five basic areas; (1) the marketing problems of Alberta commercial cattle feeders, (2) the study of cattle prices on terminal and local auction markets, (3) the establishment of a data bank for livestock statistics, (4) the study of cattle buying practices in Alberta, and (5) a general study of Alberta meat packers.

Areas one through three are complete and reports are available. Area four will not be completed due to a lack of cooperation on behalf of several meat packers. In Area five the data collection is complete and publication is pending.

LOVE, H. C., R. T. BERG, F. V. MacHARDY

Cattle feeding in Alberta—a production economics study

The study included a survey interview with the 100 largest feedlot operators in Alberta. Their planning and construction of feedlots and their investment in pens, feed storage, feed processing, feed distribution and water distribution were examined on a per head basis for the capacity of the lot. Only feedlot operators who were feeding on a year around basis were included in the study. The two largest cost components of beef feedlot production are feeder cattle and feed grains. The results of the study indicate two available alternatives to feedlot operators for reducing the costs of production: (1) the rate of feedlot capacity utilization and (2) the scale or size of the business. A substantial reduction in average nonfeed cost per animal can be expected for any size of feedlot as the total number of cattle fed during the year is increased. Details of the study are given in a Master of Science thesis by O. Glenn Dawson, "Production Efficiency in Alberta Feedlots", University of Alberta, Spring 1970, Department of Agricultural Economics and Rural Sociology. A research bulletin based upon the thesis is now in review pending authorization for publication.

WARRACK, A. A., M. H. HAWKINS

A study of least-cost alternatives for assembly of Alberta hogs

To maintain or increase its share of North American and foreign markets, the Alberta hog industry must become increasingly competitive. To do so will require improvements in production and market efficiency. The initiation of the Alberta Hog Producers Marketing Board on November 1, 1969, has provided new opportunities for the improvement of market efficiency. The focus of this thesis was a subset of market efficiency; namely, to reduce the cost of assembling and transporting hogs from the producer to the packing centre. A long-run spatial model was applied to establish a least-cost solution. This solution suggested the number, the size, and the location of assembly centres that would minimize assembly and transportation costs. Basic data requirements were: a supply analysis for each census subdivision, a demand analysis at packing centres, an operational cost analysis for assembly yards, an analysis of transportation costs, and a road-mileage matrix for Alberta.

The least-cost solution utilized the existing packing centres and selected 51 strategic assembly locations in place of over 300 existing assembly locations in the present system. Suggested average cost-savings for assembly and transportation were about 40 cents per hog. By consolidating the assembly system, the assembler to packer flow of hogs would be more uniform, resulting in cost savings at the processing level.

ANIMAL SCIENCE

CLANDININ, D. R.

Feeding value of prepress-solvent-processed rapeseed meal for laying and breeding chickens

Two experiments, designed to study the effects of feeding rapeseed meal on the performance of White Leghorn chickens were conducted. In each experiment, four groups of White Leghorns were raised on rations containing soybean meal as the main source of supplementary vegetable protein and four similar groups were raised on rations in which rapeseed meal supplied most of the supplementary vegetable protein.

Following the growing period two groups (150 females and 10 males each) of birds that had been raised on the rations containing soybean meal and two groups of the birds that had been raised on the rations containing rapeseed meal were fed a laying ration containing soybean meal while four comparable groups of birds were fed a similar laying ration except that rapeseed meal replaced the soybean meal. Insofar as possible, paired rations were made isonitrogenous and isocaloric. Records were kept on mortality, body weight, feed consumption, egg production, egg weight, Haugh units and specific gravity of eggs, and on percentage hatch.

Results obtained indicate that the levels of rapeseed meal incorporated in the starting and growing rations employed in this study caused a slight reduction in body weight at onset of egg production. In addition, a significant reduction in body weight at 72 weeks of age, attributable to the feeding of rapeseed meal during the growing period, was also noted. During the laying period, inclusion of 10% rapeseed meal in the diet as a replacement for soybean meal increased mortality and decreased first year egg production significantly.

Slight decreases in egg size, Haugh units and feed required per dozen eggs as a result of the inclusion of rapeseed meal in the rations were also noted. No adverse effects on hatching performance as a result of feeding rapeseed meal were noted.

MILLIGAN, L. P.

Studies of the Metabolism of Nitrogenous Compounds in Ruminants. Development of Non-Protein Nitrogen Sources for, and Methionine Metabolism in, Ruminants

In the study of NH_4Cl-^{15}N metabolism in continuously fed sheep, a good deal of hitherto unavailable information was derived. The findings that up to 55% of the protozoal and 65% of the bacterial protein nitrogen were derived from rumen ammonia provide criterion for the possible limits of use of non-protein (NPN) supplements in rations for ruminants. It was also found that the efficiency of microbial growth and protein formation can be substantially greater than was previously concluded in the literature. Some 17% to 54% of the nitrogen passing through rumen ammonia was found to be absorbed by the host. This nitrogen was not converted to urea and excreted, as might have been previously predicted. It was, apparently, incorporated into, and represents a significant source of, body nitrogen. Therefore, rather direct utilization by the host and the implications of this must now be considered when NPN supplements are provided to ruminants. This may well have a bearing on the 'adaptation' to urea that has been suggested by some investigators.

PLANT SCIENCE

COLOTELO, N.

Effect of selective fungicides on snow mold pathogens

The modes of action of two systemic fungicides Plantvax and Vitavax were determined on the growth, hydrogen cyanide production, and on the oxidizing enzymes peroxidase, catalase, and polyphenol oxidase. Vitavax was found to inhibit the physiological processes of this fungus to a much greater degree than Plantvax. The data indicated that these compounds affect the oxidizing enzymes, and this has been substantiated by data from other workers using these compounds for controlling nonparasitic disorders, e.g. ozone damage.

COLOTELO, N.

Effect of crop residues on developing Sclerotinia species

In summary (a) in culture, some crop residues were found to promote whereas others inhibited the growth of mycelium, production of sclerotia, and apothecia respectively of *Sclerotinia sclerotiorum;* (b) as a direct result of these studies apothecia, the sexual stage of the fungus *Sclerotinia borealis,* were found in abundance near Smoky Lake and Redwater. These apothecia are sources of inoculum for further natural infection of grasses and cereals.

TOOP, E. W.

Magnesium deficiency in greenhouse tomatoes—correlation of soil analysis with foliar analysis

Tomato plants, cv. Michigan-Ohio Hybrid were grown in nutrient solutions containing two levels of potassium (4 and 12 meq/liter, respectively) and six levels of magnesium (0.125, 0.250, 0.375, 0.50, 1.50, and 3.00 meq/liter, respectively). Plants receiving 1.50 meq Mg^{++} /liter or more did not develop deficiency symptoms whereas those receiving 0.375 to 0.50 meq/liter developed mild to moderate symptoms and those receiving 0.25 meq/liter or less developed moderate to severe symptoms. The level of potassium did not significantly affect the development of magnesium deficiency symptoms.

Maximum growth, as measured on a dry weight basis, was obtained under the lower level of substrate potassium at a minimum magnesium concentration of 0.375 meq/liter of nutrient solution. Comparable growth under the higher substrate potassium level was not obtained until the magnesium concentration was 0.50 to 1.50 meq/liter.

Maximum fruit yield was obtained at a minimum magnesium concentration of 0.50 meq/liter when the substrate potassium level was low. Comparable yield under the higher level of substrate potassium was obtained with magnesium levels of 1.50 meq/liter and higher.

Magnesium uptake measured as percentage of dry weight tended to be greater at the higher level of substrate potassium for each level of substrate magnesium but these differences were significant only for the highest level of substrate magnesium. Levels of magnesium in the leaves remained constant regardless of substrate potassium levels but at the expense of magnesium in the stems.

SOIL SCIENCE

COOK, F. D.

Agricultural use of ammoniated sulfomethylated humic acids

The objective of the project was to evaluate a coal-derived product for possible use as a nitrogen fertilizer or soil amendment. The product, ammoniated sulfomethylated humic acids (ASHA for short) is made from coal by a process developed at the Alberta Research Council. ASHA is high in nitrogen and sulphur content, and has some properties similar to soil organic matter. Investigations with coal-derived materials in other parts of the world have often shown substantial increases in crop yields from application of such materials. Therefore, this investigation was undertaken to evaluate the fertilizer and soil-amending properties of ASHA in some Alberta soils.

Field-plot experiments were conducted on four nitrogen-deficient soils to compare ASHA to inorganic nitrogen fertilizers. ASHA and a mixture of ASHA and urea were found about as effective as inorganic nitrogen fertilizers for increasing yields of barley and grass hay, or for increasing growth of a lawn.

Field plot experiments at two sites showed ASHA was neither more or less harmful to seed germination than were inorganic fertilizers. A greenhouse experiment on a soil low in both nitrogen and sulphur confirmed that ASHA supplied both nitrogen and sulphur about as effectively as inorganic fertilizers.

ASHA increased the aggregate stability of soils somewhat in laboratory tests (aggregate stability is an index of soil structure and resistance to erosion). However, ASHA did not increase water infiltration rate of soils, whereas inorganic salts of calcium produced large increases. Only one soil condition was found under which ASHA produced better plant growth than did inorganic fertilizers. On very acid soil ASHA (or more specifically a calcium salt of ASHA) to some extent overcame soil acidity damage to barley and alfalfa. The mechanism was apparently chelation of soluble aluminum by ASHA. The benefit of ASHA on acid soils is however of doubtful practical importance. It was concluded that ASHA was as efficient as inorganic nitrogen fertilizers but otherwise had no marked soil amending properties for most Alberta soils.

TOOGOOD, J. A.

Computer applications of soil test data from Alberta Soil and Feed Testing Laboratory

A circular mapping function based on the principle of a weighed moving average was applied in a computer program to the available Alberta soil test data, and nutrient levels of soils in the province were plotted and contoured. The finished maps displayed clearly marked trends. Variation in nitrate-nitrogen levels for samples from fallow and cropped land was readily seen, but correlation with soil zone was not well marked. Available phosphorus levels were relatively higher on the Solonetzic soils in central Alberta. Exchangeable potassium levels appeared to be closely related to the soil zones of Alberta.

The mapped pH values presented the least variable picture. The electronic computer was essential for the mapping of data as reported in this study, and future applications of the computer to other soil data appear to be unlimited.

CONTINUING GRANTS

Date Following Title Identifies Annual Report in which Project Description Appears

AGRICULTURAL ECONOMICS

APEDAILE, L. P.
Assessment of technical input/output relationships in Northern Alberta (1968-1969)

LOVE, H.C.
Projection of Agricultural credit needs in Alberta—1980 (1968-1969)

LOVE, H. C., D. K. McBEATH
The differential response of barley varieties to nitrogen and phosphorus fertilization and determination of economic optimum rates of application for each variety (1968-1969)

MANNING, T. W., W. M. SCHULTZ
Farm trends and prospects in Alberta (1968-1969)

PETERSEN, T. A., M. H. HAWKINS
A statistical analysis of hail suppression results in Alberta (1968-1969)

PETERSEN, T. A., W. M. ROGERS
Rate of farmer adoption of new technology as related to selected socioeconomic factors (1968-1969)

SCHULTZ, W. M.
Farmers' managerial characteristics and farm success—a pilot study (1968-1969)

AGRICULTURAL ENGINEERING

HARRISON, H. P.
Effect of traffic compaction on the cultural practice of zero tillage (1968-1969)

McQUITTY, J. B.
Effects of aeration and temperature on the composition and odours of slurry from intensively housed cattle (1968-1969)

PRESTON, T. A.
Potato harvester damage studies (1968-1969)

STEPHANSON, B. T.
Analysis of Alberta tractor accident statistics (1968-1969)

STEPHANSON, B. T.
Farm tractor repair costs and comparison of cost of operation of diesel, gasoline and L.P.-gas tractors (1968-1969)

ANIMAL SCIENCE

BERG, R. T.
Genetic effects on carcass composition in swine (1968-1969)

BOWLAND, J. P.
Determination of digestible and metabolizable energy in the diets of swine fed rapeseed meal (1968-1969)

BOWLAND, J. P.
Graduated levels of rapeseed meal for gilts to be used for reproduction (1968-1969)

CLANDININ, D. R.
Factors affecting the feeding value of rapeseed meal (1968-1969)

COMBS, W.
Recombination of quantitative traits in sheep (1968-1969)

GRIEVE, C. M.
Forage evaluation in relation to animal productivity (1968-1969)

HARDIN, R. T.
Genetic effects on body composition in poultry (1968-1969)

NIELSEN, N. O.
Pathogenesis of enteric colibacillosis in the newborn pig (1968-1969)

ROBBLEE, A. R.
Effects of Nitrovin on the growth and feed efficiency of broiler chickens (1968-1969)

ROBBLEE, A. R.
Studies on hock disorder in turkey poults (1968-1969)

WEBSTER, A. J. F.
Quantitative studies on the environmental physiology of ruminants (1968-1969)

YOUNG, B. A.
Studies on the energy expenditure and dietary energy requirements of ruminants (1968-1969)

ENTOMOLOGY

CRAIG, D. A.
The life history of Simulium arcticum in relation to its control (1968-1969)

GOODING, R. H.
A study of the insect predators of some cutworm species (1968-1969)

HOCKING, B.
An assessment of the pesticide residue situation in an urban milieu (1968-1969)

HOCKING, B.
The influence of mutagenic radiation on the development of insecticide resistance (1968-1969)

HOCKING, B.
Mosquito studies in Edmonton area (1968-1969)

FOOD SCIENCE

ARMSTRONG, J. G.
Improvements in dairy products processing (1968-1969)

ARMSTRONG, J. G.
Quality studies on Alberta potatoes (1968-1969)

CLEGG, L. F. L., F. W. WOOD
Improving cream quality (1968-1969)

JACKSON, H.
Modification (microbiological and enzymatic) of seed proteins for human conumption (1968-1969)

WOOD, F. W., F. H. WOLFE
The processing of Saskatoon berries (1968-1969)

PLANT SCIENCE

ANDREW, W. T.
Sweet corn cultural project (1968-1969)

ANDREW, W. T.
Vegetable variety trials (1968-1969)

ANDREW, W. T., W. P. SKOROPAD, T. A. PRESTON
Factors affecting plant stands in potatoes (1968-1969)

ANDREW, W. T.
Potato nutrition studies (1968-1969)

ANDREW, W. T., P. D. HARGRAVE
Chemical vine killing of potato (1968-1969)

BAILEY, A. W.
Range improvement and forage production in the parkland area (1968-1969)

CORNS, W. G.
Shore vegetation control (1968-1969)

HIRUKI, C.
Potato viruses, virus diseases, and their control (1968-1969)

KNOWLES, R. H.
Evaluation of the behaviour of turf grass species and varieties to variations in management practice (1968-1969)

KNOWLES, R. H.
The effect of light quality and temperature on the germination of seeds of woody plants (1968-1969)

PHAN, C. T.
Elaboration of conditions of storage to provide quality vegetables to Alberta markets (1968-1969)

SMITH, W. E.
Applied genetical research leading to the improvement of barley, flax, wheat (1968-1969)

TOOP, E. W.
Relationship of temperature and mineral nutrition to carbon dioxide enrichment (1968-1969)

VANDEN BORN, W. H.
Effects of 2-chloroethane phosphonic acid on herbicide translocation (1968-1969)

ZALIK, S.
Studies on lipids and nucleic acids of cereal seeds and seedlings (1968-1969)

SOIL SCIENCE

COOK, F. D.
Urea hydrolysis in Alberta soils (1968-1969)

NYBORG, M. P. K.
Computer application of soil test data from A.S.F.T.L. (1968-1969)

PLUTH, D. J.
Productivity ratings for soil types in Edson and Whitecourt map areas (1968-1969)

ROBERTSON, J. A., S. DUBETZ
Potato irrigation experiment (1968-1969)

TOOGOOD, J. A., F. D. COOK
Pipeline and petroleum effects on soils (1968-1969)

WEBSTER, G. R., J. A. ROBERTSON, H. C. LOVE
Crop yield and quality on certain "Bench Mark" soils as related to environmental and soil variables; determination of economic optima (1968-1969)

NEW GRANTS—EFFECTIVE 1970

AGRICULTURAL ECONOMICS AND RURAL SOCIOLOGY

APEDAILE, L. P.

The effect of management variables on economic returns in irrigated agriculture

The objective of the research project is to determine the effect of a number of management variables upon net farm income of irrigation farmers. The management variables considered are in most cases of the type that can be directly influenced by the manager himself or by agricultural programs designed to improve management decisions. The significance to agriculture is that programs can be directed towards the most significant areas of influence to improve irrigated farm performance thereby making the most out of public investment in irrigation.

HAWKINS, M. H.

Retail meat demand relationships

To study the demand relationships between meats at the retail level. To develop recommendations towards increasing consumer demand for pork products. To ascertain the effectiveness of advertising and promotion in increasing pork consumption.

HAWKINS, M. H.

The effect of weather and holiday factors on Alberta hog supply

To discover the relationships between hog supply, weather, and holiday factors.

PETERSEN, T. A.

Feasibility of beef calf production on existing Alberta wheatlands

Alberta wheat producers are continually short of alternatives for the use of their lands. This has resulted in wheat surpluses followed by surpluses in other grains and seed crops. The long term outlook for beef is favourable, but there is a question whether western Canada can produce enough beef calves for the feedlot.

Several studies in the USA and experience of some farmers indicate that a semidrylot cow-calf operation may be feasible. This would give existing grain producers more flexibility in production. It is the purpose of this proposed research project to explore the feasibility of various methods of beef production, using resources which are now producing wheat.

AGRICULTURAL ENGINEERING

DOMIER, K. W.

Classification of Alberta soils by traction characteristics

To classify Alberta soils by traction characteristics, shear strength, penetration, resistance and power requirements for tillage. This information will provide useful data for researchers and extension workers involved in tillage and traction.

McQUITTY, J. B.

A system engineering analysis of harvesting and storage of cereal grains

The objectives of the project are to analyse and evaluate the various components and systems involved in cereal grain harvesting, handling and storage and to seek to optimize the overall system functions. New methods of grain storage, such as sealed storage, chemical preservation and chilled storage, offer possible alternative systems to the conventional in grain harvesting, handling and storage practices, particularly with regard to the eventtual utilization of the grain on the farm as a livestock feed.

McQUITTY, J. B.

The effect of chemical treatments on the storage behavior of tough and damp cereal grains

The objectives are to study the effects of chemical preservative treatments, notably the lower fatty acids on temperature levels, moisture migration and spoilage during storage of tough and damp feed grains. Chemical preservation appears to offer an alternative system of safe storage for tough and damp grain intended for animal feed. This would eliminate the necessity of drying such grains to a safe moisture content or alternatively storing it under air-tight or chilled conditions. It may also have advantages with regard to harvesting in that this operation would be less weather dependent where tough or damp grain was an acceptable product.

ANIMAL SCIENCE

CLANDININ, D. R.

Use of rapeseed meal in laying and breeding rations for chickens

In previous studies it was found that the inclusion of 10% rapeseed meal in the ration of laying and breeding chickens depressed egg production and increased mortality. The objectives of the studies are: 1) to determine whether 5% rapeseed meal can be used in a laying ration for chickens without causing adverse effects; 2) to determine whether 10% rapeseed meal produced from the Bronowski variety of rapeseed can be used in a laying ration without causing adverse effects.

HOWES, A. D.

Evaluation of fat and protein nutrition in the bovine

In determination of total net energy values of feeds for beef cattle it is necessary to have some measure of the energy retention brought about by the consumption of a given quantity of feed. However, net energy values of feeds for beef cattle are only available from work done in the United States and are not applicable to Canada because of differences in feeds and climate conditions. Therefore, the specific objective of this study is to investigate a comparative slaughter method currently being used in the United States and to describe and delineate its application in determining energy retention and net energy values of feeds for beef cattle in Canada.

HOWES, A. D.

Effect of urea supplementation for ruminants

In ruminants, grain is fermented in the rumen at a rate similar to the hydrolysis of urea. However, roughage rations are digested too slowly to incorporate urea hydrolysis into microbial protein. Therefore, a study to investigate the possibility of improving the incorporation of urea into roughage rations should improve the efficiency of non-protein nitrogen utilization of ruminants.

FOOD SCIENCE

HADZIYEV, D.

Oxidation properties of glycolipids of green fruit and vegetables

The oil from green plant material (fruit and vegetables) contain a glycolipid rich fraction which presence might influence the overall reactibility of oil. From the model reaction systems the results obtained might provide further information about the lipid changes occurring in fresh fruit and vegetables under different storage conditions (temperature, partial O_2 pressure and moisture).

PACKER, G. J. K.

Effect of pre-freezing and thawing on characteristics of potato dried by freeze-drying and other methods

The project aims to understand the mechanism and evaluate the effect of freezing and thawing before drying of potatoes. Particular reference will be made to improving the reconstitutability of dried potatoes.

WOOD, F. W.

Sex taint in pork

To determine the contribution of boars, ridglings and gilts to sex taint in pork and develop a rapid and accurate objective method for the detection of the causitive compound. Hog breeders claim the the meat of boars is superior in quality but their purchase is not permitted under Health of Animals Regulations.

PLANT SCIENCE

BRIGGS, K. G.

A plant breeding program to investigate the development and agronomy of feed wheat varieties suitable for Northern Alberta

The main objective of this project is to evaluate clearly the possibility of producing feed wheat varieties adapted to the climatic conditions of Northern Alberta, and which will be competitive with other feed grains. Hybrid seed of over 150 crosses involving mainly semi-dwarf Mexican wheats is available, and the yielding ability and feed quality of advanced lines from these crosses will be assessed under a range of agronomic practices.

BRIGGS, K. G.

A barley breeding program for Northern Alberta, with associated agronomic studies

The objective of this project is to produce an early, high yielding, dwarf barley with acceptable malting quality, suitable for growing in Northern Alberta. A pedigree method of breeding will be used, with selection for yield and micromalting quality conducted in early generations. High yielding lines which do not meet malting quality standards will be evaluated for their potential as feed varieties. The effect of late fall seeding of spring barley varieties on maturity, malting quality and yield will be investigated in conjunction with the breeding program.

BRIGGS, K. G., Z. P. KONDRA, P. D. WALTON

Plant breeding selection and research

Selection programs aimed to produce improved varieties of feed wheats, rapeseed and forages will be established. In all cases the new varieties should be higher yielding, of a more suitable quality and with better agronomic adaptation than existing strains.

KNOWLES, R. H.

The effect of microclimatic variation on the survival of woody plants

Microclimatic variations obviously play a significant role in the survival of woody plants. Some knowledge of the effect of favourable microclimates is fundamental in evaluation of cultural practices.

KONDRA, Z. P.

Evaluation of agronomic practices and early maturing rapeseed strains as a means of advancing crop maturity in Northern Alberta

The prime objective is to advance rapeseed crop maturity by developing early maturing varieties and/or new agronomic practices. This would result in a higher frequency of fully mature, high quality rapeseed crops in Northern Alberta.

SKOROPAD, W. P.

Screening of cereals and forage grasses for resistance to Colletotrichum graminicola

Colletotrichum graminicola, the incitant of anthracnose of graminaceous hosts, causes substantial losses in yield of cereal crops and some forage grasses. The breeding and use of resistant varieties offers the only practical means of control. There are no known sources of good resistance. Discovery of resistant material has been hampered by the unreliability of artificial inoculation techniques, especially under field conditions. The objective of this project is to get a better understanding of the physiology of infection of this fungus in order to develop reliable techniques for infection, and thus facilitate breeding programs.

TOOP, E. W.

The interaction of other cations on magnesium uptake and distribution

The objective of this project is to investigate the interaction of cations on magnesium uptake and distribution in plants. Magnesium deficiency symptoms are common on greenhouse tomato crops in the Medicine Hat area and applications of magnesium salts to these crops usually fail to alleviate the problem. Finding a means of overcoming this problem would prove of great benefit.

VANDEN BORN, W. H.

Testing of experimental herbicides

Performance of new candidate herbicides in relation to differential responses of weeds, crops and crop productivity.

WALTON, P. D.

The improvement of forage species by mass selection

This study would examine the genetic variation in forage species from old established pastures in Alberta. Characters of economic importance would be evaluated with the object of obtaining, by mass selection methods, forage varieties of improved yield and quality.

SOIL SCIENCE

BENTLEY, C. F.

Sulphur studies

(1) Ascertain the effects if any, of petroleum industry on sulphur deficiency; (2) Attempt to develop practical test(s) for sulphur deficiency; possibly (3) Study nutritive significance of nitrogen/sulphur ratio in feeds.

NYBORG, M. P. K.

Calibration of soil testing methods

To select and develop the best soil testing methods for predicting the needs of field crops for nitrogen, phosphorus, potassium, and sulphur fertilizers.

NYBORG, M. P. K.

Soil testing—evaluation and improvement

The general objective is to evaluate and improve soil testing procedures so that ASFTL recommendations to farmers will result in the most efficient fertilizer use and cropping practices. Specific objectives are as follows: (1) To develop soil test methods for phosphorus and potassium that give better predictions of crop response; (2) To evaluate use of soil test for sulphur and soil acidity on Black and Dark Brown soils (use of these tests is presently confined to Gray Wooded soils); (3) To evaluate soil testing procedures for forage crops.

PAWLUK, S.

Use of remote sensors for land classification purposes

(1) Conduct research on the application and use of remote sensor techniques as a means of compiling inventories on our agricultural and forest land resources with special emphasis on soils and land use. (2) To develop meaningful signals that can be used for measuring field parameters such as soil moisture, temperature, type as well as present land use from several bands of the electromagnetic energy spectrum. (3) To establish suitable computer programs for delineating IR scanning data from magnetic tape to meaningful maps.

PLUTH, D. J.

Nutrient distribution and cycling in selected forest ecosystems

The initial and primary objective is to characterize the nutrient element distributions in plant strata and within the soil profile in selected disturbed and undisturbed forest communities. The practical significance of a knowledge of nutrient element distributions develops in (1) management of forest communities to increase rate of nutrient cycling within the system, (2) removal of nutrients in the harvest of forest products and (3) alterations to nutrient distributions as a result of major changes in land use such as forestry to agriculture (improved pasture), simultaneous use for forestry and range, and conversion from agriculture to forestry.

WEBSTER, G. R.

Poor growth of alfalfa on some Alberta soils

To determine whether parasitic nematode *Paratylenchus* spp. is responsible for poor growth of alfalfa in fields where it had grown well previously.

INTERDISCIPLINARY

BENTLEY, C. F., K. W. DOMIER, M. P. K. NYBORG

Zero Tillage

"Zero Tillage" may have advantages which should be evaluated in relation to subsequent effects. Objectives: (1) If possible, develop effective methods and equipment for "zero tillage", including seeding techniques. (2) Determine effects on density and compaction of soil. (3) Determine nitrogen fertilizer needs under such a cropping system. (4) Ascertain effects on soil moisture. (5) Evaluate "zero tillage" for various economic circumstances. (6) Attempt to determine if procedures cause herbicide residue accumulation.

PRESTON, T. A., W. T. ANDREW

Potato planting systems study with simulated gaps for yield indices

To determine the effect of gaps on the marketable yield of adjacent plants. Preliminary studies indicated in 1969 that 75% plant stands may be reducing Albertan gross yield by $1,000,000.00 + p.a. If the tentative finding is correct, that gaps are associate with 10% loss of yield in adjacent plants, the cost to the industry is $1,100,000.00 +.

STILES, M.E., L. F. L. CLEGG, M. H. HAWKINS

Influence of consumer awareness on comsumption of Alberta agricultural products

To evaluate methods of increasing consumption and awareness of Alberta agricultural products in Alberta. To determine whether the Alberta agricultural products compare favourably with competitive products for quality and price. To determine whether these products are meeting consumer needs.

WESTERN COLLEGE OF VETERINARY MEDICINE

BIGLAND, C. H.

Studies on the control of Mycoplasma PPLO infection in turkeys

To breed by A.I. an *M. meleagridis* free flock to (a) maintain an *M. meleagridis* free flock for future years; (b) use *M. meleagridis* free eggs and poults to assess the pathogenicity of the organism and its effect on hatchability, livability, weight gains, vaccination procedures and control in turkey breeding flocks, (c) supply *M. meleagridis* free eggs or poults to other investigators. Infection with *M. meleagridis* is widespread in turkey flocks in Canada, U.S.A. and Great Britain. Only three flocks are known to be free of *M. meleagridis* in the U.S.A. In Canada, after trying for four years we now have a small flock free of *M. meleagridis* as tested by serology and culture.

LEIPOLD, H. W.

Cause and nature of myoclonia congenita *in piglets*

A study is proposed to elucidate if *myoclonia congenita* (trembling pigs, shaky pigs) is infectious in nature. This disease has been reported in most hog raising areas of the world. It is an important problem to the hog industry in Western Canada.

NIELSEN, N. O.

Pathogenesis and control of enteric colibacillosis of swine

Diseases of the intestinal tract appear to be the most common cause of disease losses in pigs in Alberta. Of these enteric collibacillosis (i.e. baby pig scours, eanling diarrhea and edema disease) probably is the most important. It is proposed to expand our research into the fundamental nature of enteric colibacillosis and with the knowledge gained develop more effective control of this problem.

RADOSTITS, O. M.

To determine the efficacy of an infectious bovine rhinotracheitis vaccine against the abortion form of the disease in cattle

The objective is to determine whether or not the vaccine for the respiratory form of infectious bovine rhinotracheitis (I.B.R.) will prevent the abortion form of the disease which has occurred in epidemics in beef cattle herds in Alberta and Saskatchewan within the last two years.

STATEMENT OF CONTRIBUTIONS, INCOME AND DISBURSEMENTS

		CUMULATIVE TOTALS
	September 1, 1969 to August 31, 1970	April 1, 1966 to August 31, 1970
CONTRIBUTIONS:		
GOVERNMENT OF ALBERTA	100,000.00	900,000.00
INDUSTRY*	99,845.16	252,413.25
TOTAL CONTRIBUTIONS	199,845.16	1,152,413.25
UNAPPROPRIATED SURPLUS AS OF SEPTEMBER 1969	257,935.43	
INVESTMENT INCOME	22,148.71	94,131.43
TOTAL FUNDS AVAILABLE	479,929.30	1,504,480.11
FUNDS ALLOCATED FOR RESEARCH	382,370.23	1,288,998.63
UNAPPROPRIATED SURPLUS AS OF SEPTEMBER 1970	97,559.07	
FUNDS GRANTED IN AID OF COMPLETED RESEARCH		178,350.00

*See Names of Contributors, Last Page.

CONTRIBUTIONS

from sources listed
are gratefully acknowledged
September 1, 1969 - August 31, 1970

- Alberta Dairymen's Association
- Alberta Hog Producers Marketing Board
- Alberta Potato Commission
- Alberta Poultry Hatcheries Association
- Alberta Vegetable Marketing Board
- Alberta Wheat Pool
- Brewing and Malting Barley Research Institute
- Chemcell Limited
- Cominco Limited
- Cyanamid of Canada Limited
- Dekalb Agricultural Research Incorporated
- Gainers Limited
- Huron and Erie Mortgage Corporation
- Niagara Brand Chemicals
- Ontario Seed Cleaners and Dealers Limited
- Rapeseed Association of Canada
- United Grain Growers' Limited
- U.S. Borax
- Western Cooperative Fertlilizers Limited
- Western Hog Growers Association

TOTAL $99,845.16

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